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Creel Survey of the Recreational Fishery of the North Fork of the Holston River

**A Final Report Submitted to
Tennessee Wildlife Resources Agency**

by

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INTRODUCTION

The status and use of eight tailwater trout fisheries managed by the Tennessee Wildlife Resources Agency were investigated between 1994 and 1999 (see Bettoli et al. 1999). Angler use and harvest rates on each of these tailwaters were examined with roving creel surveys and detailed examinations of survival, growth and exploitation of trout were conducted on six of those tailwaters. However, similar data were lacking for most coolwater or warmwater river fisheries in Tennessee. Condo and Bettoli (2000) reported on fishing pressure and harvest rates on the Duck River in central Tennessee, but little, if any, information is available for other unregulated rivers in Tennessee. This report characterizes the fishery of the North Fork of the Holston River (NFHR) near Kingsport, Tennessee, during the 2001 fishing season. The NFHR supports a popular fishery for smallmouth bass *Micropterus dolomieu*. The NFHR originates in southwestern Virginia and flows for 8.3 km (5.2 miles) in Tennessee before it joins the Holston River near the Holston Army Ammunition Plant (Figure 1). The 7-km of the Holston River within the boundaries of the Army plant are closed to fishing year-round.

METHODS

The roving creel survey began March 1 and ended October 31, 2001. The survey was stratified by month and kind-of-day. During the eight-month survey, the river was surveyed on 61% of the weekend days and holidays and 31% of the weekdays. Sample days were chosen at random. The average number of daylight hours each day during the first half and last half of each month was determined and each workday was then divided into morning (dawn to midday) and afternoon (midday to sunset) shifts. The AM and PM shifts that were surveyed were randomly chosen with equal probabilities.

The clerk counted anglers twice each work shift. The reach of the river where counts were made ran from the Virginia State line to the confluence with the South Fork of the Holston River. Anglers fishing along the riprap jetty at the confluence were also counted; anglers fishing from the city park property upstream of the confluence were not counted. The time to start the first count was randomly selected from a list of possible start times for each shift, beginning at daylight (or midday) and every 30 minutes thereafter until 2 hours before the end of the shift. The second count was made two hours after the first count began and the average of the two counts was used in subsequent calculations of fishing effort. Before and after each count, the

clerk interviewed anglers.

If anglers agreed to be interviewed, they were asked how long they had been fishing, whether they were finished fishing, and how many fish they had caught. Anglers were asked their state of residency and Tennessee residents were also asked for their county of residence. The clerk recorded the method of fishing used by each angler and measured (total length, cm) any smallmouth bass in the creel.

Mean daily counts were expanded to estimate effort in each stratum (i.e., kind-of-day) and then pooled to estimate effort each month following the methods of Pollock et al. (1994). All interview data were pooled to estimate the rates that smallmouth bass were caught and harvested. These rates were measured using the mean of ratios method, which is recommended for roving creel surveys (Pollock et al. 1997); interviews of parties that had been fishing for less than 30 minutes were excluded from the analysis. Total catch and harvest of smallmouth bass was then estimated for each month. Standard errors of catch, harvest, and effort each month were calculated according to Pollock et al. (1994). A spreadsheet program performed all necessary calculations. The mean-square-successive-difference-between-months procedure was used to calculate the variance of total fishing pressure and harvest during the survey.

The length of time each completed-trip party had fished was used to calculate average trip length. Estimated fishing pressure was then divided by mean trip length to estimate the number of trips anglers made to the tailwater.

RESULTS

The creel clerks interviewed 315 parties over the survey period, representing 492 anglers. Tennessee residents accounted for 94% of the interviewed anglers; 5% were Virginians. Sullivan county, which includes Kingsport and borders the North Fork of the Holston River, was where most (79%) of the Tennessee anglers resided. Resident anglers also reported living in Hawkins County (which also borders the river; 16%) and Washington (3%) and Greene (2%) counties.

In addition to being overwhelmingly a local fishery, the recreational fishery of the North Fork of the Holston River was very seasonal in nature and directed almost exclusively at smallmouth bass. Fishing pressure over the eight-month survey totaled 13,707 hours. Mean trip length equaled 1.83 hours; thus, 7,490 trips were made to the river over the study period. Most (85%) of the fishing pressure occurred during the first three months of the survey (Table 1). Fishing pressure was at barely detectable levels by September and October 2001.

Nearly all (95%) of the anglers interviewed were targeting smallmouth bass; the remaining 5% of anglers were not specifically targeting any species. Nearly all of the fish that anglers reported catching, as well as those observed in the creel, were smallmouth bass (93% and 98%, respectively). Interviewed anglers reported catching 543 smallmouth bass, 13 sunfish *Lepomis* spp., 12 suckers F. Catastomidae, three largemouth bass *M. salmoides*, and one channel catfish *Ictalurus punctatus*. Sixty-one smallmouth bass were observed in the creel; the only other fish observed was a single rock bass *Ambloplites rupestris*. Smallmouth bass in the creel averaged 382 mm in total length (TL; SE = 7.4; n = 54) and the distribution of lengths in the creel represented a high-quality smallmouth bass fishery (Figure 2). Anglers fishing with lures and artificial baits outnumbered those fishing with live baits by more than a two-to-one margin (70% and 30%, respectively).

Completed-trip anglers who targeted smallmouth bass (i.e., intended anglers) caught an average of 1.47 smallmouth bass per angler per trip. The fishery was largely a catch-and-release fishery, as the harvest rate was only 0.18 smallmouth bass per angler per trip. About 53% of intended anglers caught at least one smallmouth per angler per trip but only 8% harvested a smallmouth bass. Over 8,400 smallmouth bass were reportedly caught during the survey period, of which a much smaller number (n = 713) were harvested (Table 1). A small minority of anglers (3%) accounted for most (70%) of the observed smallmouth bass harvest.

DISCUSSION

The only other Tennessee bass fishery in an unregulated river that has been surveyed for angling pressure in recent decades is the Duck River (Condo and Bettoli 2000). In that survey, the Duck River received about 25,000 hours of pressure over a 7-month fishing season, which

equated to only 3.4 hours per week per river km. A comparable number for the North Fork of the Holston during the 2001 survey was 47 hours per week per km.

Exploitation of smallmouth bass in the North Fork of the Holston River was not measured, but the results from an ongoing telemetry study of smallmouth bass movements in the Holston River system suggest that exploitation was low. Only three of 25 radio-tagged smallmouth bass were caught by anglers in that study, and all of those recaptures occurred during late winter and early spring. Some of the tagged smallmouth bass moved up into the North Fork of the Holston River, presumably to spawn, in the spring of 2002 but subsequently returned to the mainstem of the Holston River after a few weeks. The “No Fishing” refuge in the Holston River provided by the Holston Army Ammunition Plant undoubtedly contributes to the quality fishery that exists seasonally in the North Fork by limiting the time that many adult smallmouth bass are vulnerable to harvest.

Distinct seasonal movements of smallmouth bass would help explain the temporal pattern of fishing pressure on the North Fork of the Holston River observed in 2001. When this creel survey began in March 2001, fishing pressure was already high relative to the low levels observed after May 2001. Future surveys of the fishery in the North Fork would benefit from starting earlier in the year.

The smallmouth bass fishery in the North Fork of the Holston River was not a destination fishery in the sense that few anglers traveled more from more than a county away. Nevertheless, it was a high quality fishery that produced memorable smallmouth bass between 400 and 500 mm TL.

MANAGEMENT IMPLICATIONS

Carter et al. (2000), while discussing the angler survey findings of Jakus et al. (1999), noted that most anglers supported size limits or protected slot-limits for stream-dwelling black bass populations. If a two-fish creel limit was in effect during this survey of the North Fork (and compliance was 100%), the observed harvest of smallmouth bass would have been reduced nearly 40% and only 3% of the anglers would have been forced to return fish that they otherwise would have kept. If the current creel limit of five fish remained, but minimum size limits of either 356 mm (14”) or 406 mm (16”) were in effect, observed bass harvest would have been

reduced by 26% or 65%, respectively. The ability of the North Fork of the Holston River fishery to produce memorable-size smallmouth bass suggests that it is a good candidate for special regulations to protect and enhance the quality of that fishery.

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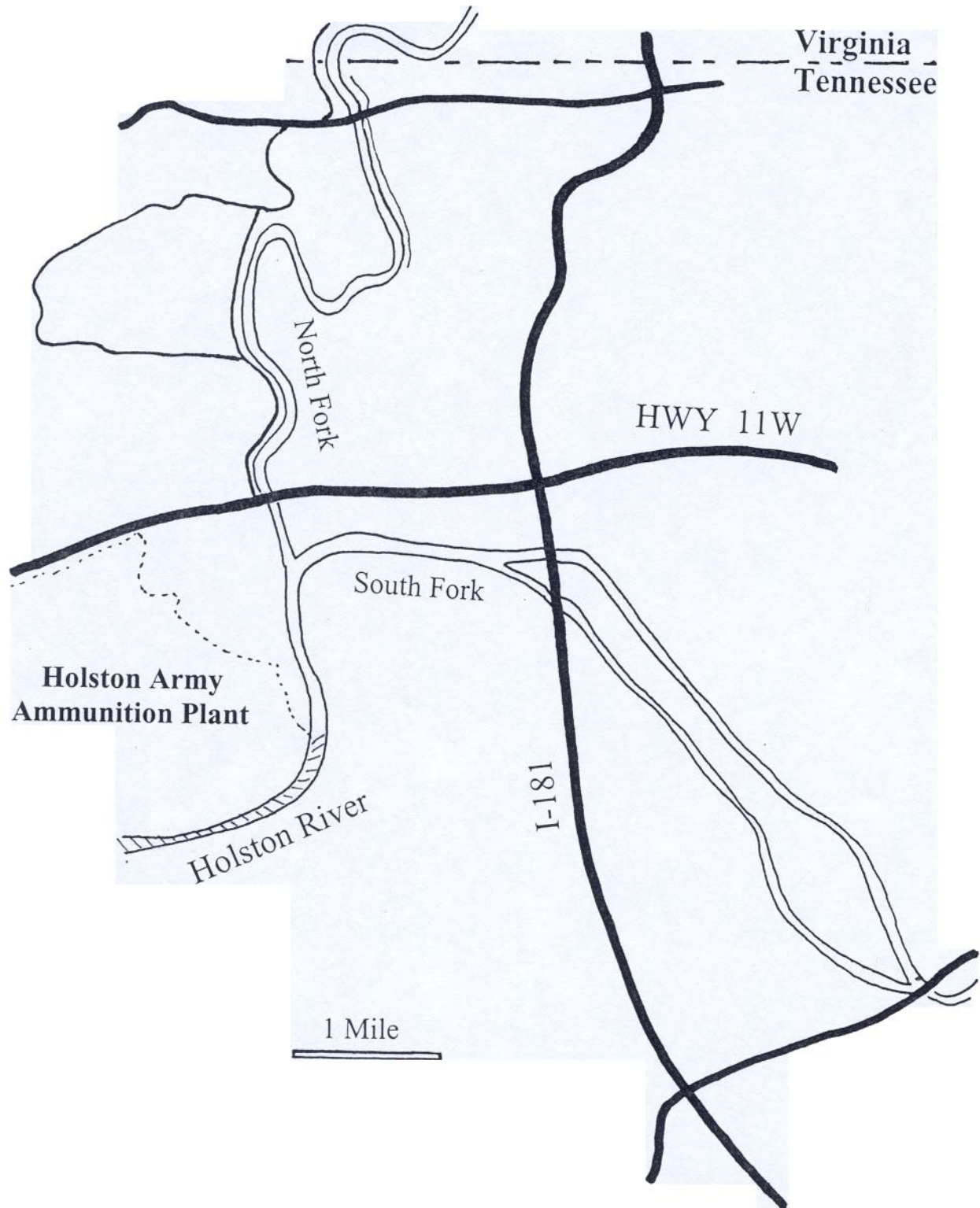


Figure 1. Map of the confluence of the North and South Forks of the Holston River near Kingsport, Tennessee. Cross-hatched area of the Holston River in the Army Ammunition Plant is closed to fishing.

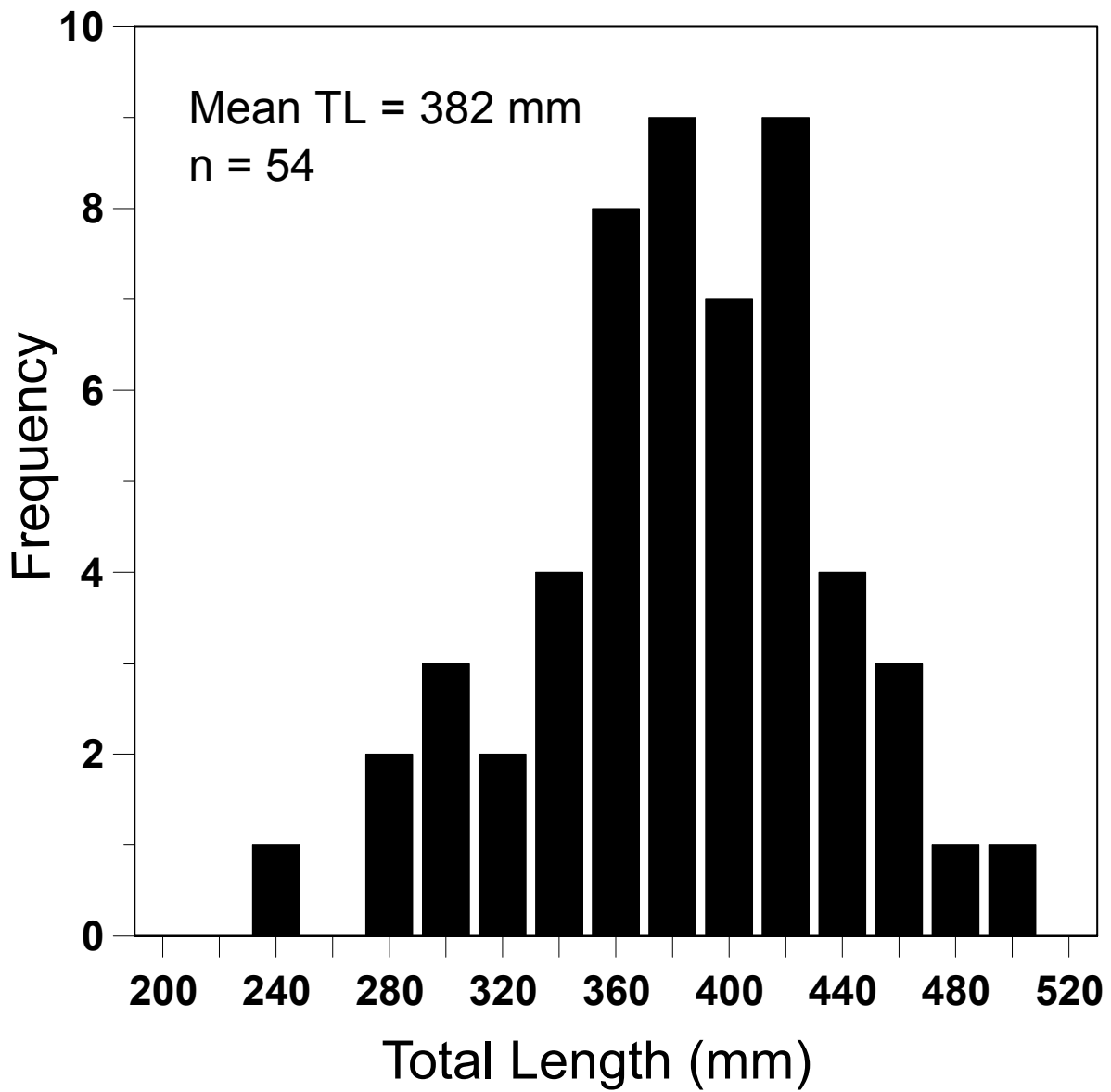


Figure 2. Total length-frequency distribution for smallmouth bass harvested by anglers on the North Fork of the Holston River, March - October 2001.

Table 1. Fishing pressure and catch and harvest of smallmouth bass in the North Fork of the Holston River near Kingsport, Tennessee, 2001. “ni” = no interviews.

Month	Pressure (hours)	SE	Number Caught	SE	Number Harvested	SE
March	2,965	774	2,508	958	340	121
April	6,334	797	3,841	699	337	95
May	2,343	474	1,548	824	12	12
June	608	128	170	82	8	5
July	752	153	244	99	14	7
August	324	106	107	88	2	1
September	230	42	0	-	0	-
October	151	102	-ni-	-	-ni-	-
Total	13,707	4,175	8,418	2,264	713	246

Creel Survey Forms

INTERVIEW SHEET - NF HOLSTON 2001

DATE (Month/Day) _____

INTERVIEW NUMBER _____

KIND-OF-DAY _____

NUMBER IN PARTY _____

Weekday = 1 Weekend / holiday = 2

START OF FISHING _____
(or Time of Interview)

END OF FISHING _____

Time Fishing HRS _____
By Party
 MIN _____

COMPLETED TRIP? _____
YES = 1 NO = 2

SPECIES FISHED FOR: _____ Smallmouth Bass (SMB) Rock Bass (RB)
Sunfish (SF) Redhorse (RH) Anything / Other (A/O)

SPECIES CODE _____ NO. CAUGHT _____ NO. RELEASED _____ NO. HARVESTED _____

TOTAL LENGTHS (mm) _____

SPECIES CODE _____ NO. CAUGHT _____ NO. RELEASED _____ NO. HARVESTED _____

TOTAL LENGTHS (mm) _____

For METHOD, TERMINAL GEAR, and LOCATION, numbers entered should equal number in party.

METHOD STILLFISHING _____ SPINFISHING _____ FLYFISHING _____

TERMINAL GEAR ARTIFICIAL LURES or FLIES _____ BAIT _____

LOCATION ON BANK OR WADING _____ IN BOAT _____

STATE _____ and **COUNTY** (if Tennessee) _____

If they are willing to participate in a mail-in survey, record their address(es):

Name _____.

Address _____.

City/State/Zip _____.

DAILY SAMPLE SHEET -North Fork Holston 2001

DATE (month/day) _____ SHIFT _____ (AM or PM)

KIND OF DAY _____

01 = weekday 02= weekend/holiday

TIME of FIRST COUNT _____ TIME of SECOND COUNT _____
(military time)

<u>FIRST COUNT</u>		<u>SECOND COUNT</u>	
On bank/ Wading	In boats	On bank/ wading	In boats

1. WEST BANK LOOP _____.

2. EAST BANK LOOP _____.

3. ROCK JETTY LOOP _____.

TOTALS _____ .

End Mileage = _____.

Beginning Mileage = _____.

Total Mileage = _____.

CLERK _____ .